STUDIES IN PRINCIPLES OF EDUCATION

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III. APPLICATION

One of the most urgent problems of present-day education is that of training pupils to meet the practical issues of life. Knowledge is of no value in the opinion of the ordinary man unless it can be applied. The school is urged to eliminate from the course of study everything which has no bearing on business or health or other practical interests. Our arithmetics must have examples which show the applications of addition and subtraction to buying and selling. We must put into arithmetic more measurement because this can be used. In geography it is the same. We must eliminate the fruitless discussions of boundaries and the long lists of names and study routes of travel and the lines of trade. In the high school we must emphasize science and reduce the attention to literature. In all schools we must give a place to handwork.

This demand for practical applications is no mere academic plea. School boards are calling upon teachers and superintendents to show reasons for this and that type of instruction in the schools. Merchants and manufacturers are devoting time to the discussion of educational problems and are suggesting trade training or the shortening of the course. Parents are withdrawing their children from the schools as early as the law will allow, confident that more valuable training will be gained through contact with the shop or store or farm than from continued schooling. Pupils are restless and inattentive because they do not see what use it is to study that which is offered in the schools.

This extreme emphasis on practical applications is in contrast with the assumption which was formerly the accepted assumption of the school. It used to be regarded as the duty of the school merely to prepare in a somewhat remote way for later life. It was

thought that the child should learn to read in school and that later in life he would find uses for reading. So too with number ideas and with geography. These should be cultivated in the school, not as practical arts, but as systems of knowledge. The practical arts were thought of as in some sense different from the knowledge taught in the schools. Indeed, knowledge or theory was often described as wholly different from practical application and skill.

When the urgent demand for practical training encounters the old-time attitude of the school that education is a remote and indirect preparation for later life, some readjustment becomes necessary. The readjustments which are being worked out today are of various types. For purpose of illustration we may refer to three typical efforts along these lines.

First, there is the short-term trade school. This institution goes about the task of making a tradesman of the boy with the greatest possible directness. Here is a boy who would leave school if he were obliged to go on with reading and arithmetic; let us make a carpenter or a mason of him, recognizing that skill in one of these trades will make him a more efficient citizen. Training in a trade is here substituted for book-learning and all the common school subjects. Skill with the saw and hammer is capable of direct application in the urgent practical world where the student must make his living. Substitute skill for knowledge and abandon the effort to make the boy or girl skilful through knowledge.

One cannot consider this first suggestion without realizing that it is based on a deep-seated pessimism regarding the ordinary school course. The ordinary course has an aim which is supposed to be much higher than the mere acquisition of skill. Reading is supposed to give the individual an outlook on the world which will include a correct view of the need and value of skill and industry and will arouse the worker to the highest efforts, but will at the same time give a comprehension of the trade. The short-term trade school says, in effect, the supposition that reading is of value has been overdone. It is better for at least a part of our population that no further emphasis be laid on reading. Their reading is not adequate to guide them in the acquisition of skill. Their reading has not fitted them to make a satisfactory living. Put an end to

teaching reading, make a radical change and teach something very different.

If the substitution of pure trade training for our present educational program should become common, it would mean the most radical change in the social treatment of children that has ever been worked out. The most impressive evidence that this would mean an abandonment of our present ideas about the significance of education appears when one considers how little industry stimulates those kinds of intellectual activity which the school aims to cultivate. The ordinary plumber is not stimulated by the experiences which he encounters to study geometry or chemistry or even to read the mechanical journals. The fact is that the more skilful a man becomes, the less likely he is to seek intellectual aids in his work. Trades do not lead workmen to study. The man who reads about the materials which he uses brings the motive for reading into the trade, rather than finds that motive in his practical life.

A second typical suggestion which has been made is the suggestion that certain practical lines of activity be added to the course of study or be substituted for a part of the course. Thus manual training is to take the place of some of the history or a part of the grammar. The use of tools is to be taught while at the same time the essential subjects are kept in their former places in the school program. For the girls cooking is to become a part of school training.

This suggestion conforms more closely to the common notion about what a school ought to do. Some local disputes arise as to how far the new subjects should be allowed to encroach on the old, but in general the new courses and the old are both more or less respected. Yet even this respect for both types of work is colored by a feeling that they are at bottom different. Teachers of the manual arts are looked upon as different in their interests and methods from teachers of reading and grammar and arithmetic. While there is a great deal of discussion about reconciling the two types of work and relating them and deriving motives for one out of the other, the fact remains that no successful fusion has been achieved. Training for knowledge, for reading, and for number

work continues to be one kind of training; training for shopwork and cooking is of another type.

Finally, there is the suggestion that there be a frank division of the pupil's time and energy such that he shall spend part of his time in the school and part in some practical work of the world. He shall go into a shop and work in wood or metal, or she shall go into a store and clerk or into a kitchen and cook, but while thus engaged in practical activity, the pupil shall withdraw from the shop or store for a few hours each week and study in some school.

This third suggestion, like the other two, and perhaps more clearly than either of the others, recognizes a difference in character and in spirit between the two types of training. The shop and the store are practical institutions, bent on giving skill as soon as possible. The part-time class in the school supplements the shop with something that the shop cannot give. Together the shop and school cultivate two distinct sides of the child's nature.

This part-time plan differs from the trade-school plan in two essentials. First, this plan does not lay on the school the obligation of doing the practical work. Furthermore, the part-time plan is not wholly pessimistic about the value of the conventional school courses. The part-time plan recognizes schoolwork as fulfilling a function of its own. It limits the amount of schoolwork, to be sure, but admits its value.

As contrasted with the manual-training plan, the part-time plan recognized from the beginning the fundamental and abiding distinction between trade training and schoolwork. It goes so far as to give the supervision of the two types of training to two wholly separate institutions. The hope of the advocates of manual training that handwork will some day be merged into ordinary school work is here abandoned. The school is set off very sharply from the shop and the store. The school is to co-operate with the shop and the store but never to confuse its mission with theirs.

It is not the primary purpose of this paper to advocate or condemn any of the plans above discussed. It is the purpose of this study to discover and evaluate the principles which underlie these various experiments in school organization.

One principle which comes out with perfect clearness in each of

the above described suggestions is the principle that practical skill cannot be identified with conventional school courses. Put in specific terms, we may assert that reading can never be identified with shopwork. The manual-training movement has striven faithfully to correlate the two as intimately as possible, but has failed to unite them in any complete way. The part-time school and the short-term trade school recognize the difference without reserve.

The general principle which thus grows out of experience in school organization is that some adjustment must be made between practical applications and theoretical studies other than that which involves the identification of the two. There must be some arrangement of the work in such a sequence as to allow theoretical training to precede practical training or follow it so as to maintain the distinctive advantages of each kind of training.

A concrete example of such a sequence can be described in the case of reading. In the primary grades reading is taught as a process of recognizing words. The children have to learn certain forms of perception, and have to connect with these forms of perception certain articulations. As they progress through the second and third year, it becomes less and less necessary for them to emphasize the formal side of reading. They acquire the mechanics of reading and establish a well-organized habit. As soon as this habit is once established, the pupils grow restless if they are required to go on with more reading of the same type as that which they have taken in the first years. There should be a change in the motive for reading, and there should be a change in the method of instruction. The reading should be employed as a means of introducing the pupil to large bodies of information which will be of some advantage to him in his later practical life.

In such a case as this the relation between theoretical training of the early years and practical applications is such that application of reading follows reading. The term "application" is used in this case in the broad sense, and includes not merely the application of reading to some form of handwork, but also the application of the relatively simple art of reading to higher and more mature forms of experience. It is quite as much an application of reading when

we require the pupil to use reading for the sake of acquiring geographical knowledge as it is when we require him to use his reading in understanding directions which are given to him in the shop or in the cooking-class.

In none of these cases, however, is application identical as a mental process with the first intellectual efforts involved in acquiring the ability to read. The acquisition of the ability to read depends upon close attention to the letters and words and to the articulations which are necessary in uttering the words which are seen on the page. The center of attention, therefore, is upon the page, and upon the formal side of the reading process. So limited is the scope of the pupil's attention that there is scant opportunity in the early stage of reading for him to look beyond the printed page and see the significance of the passage. Later, after the art of reading has matured, the child finds it unnecessary to give close attention to the formal side of the process. When he looks at a printed page with its succession of words, he is able immediately to connect with the printed word the appropriate articulation. He is now free to allow his mind to go beyond the printed symbols to the meaning. The extent to which he can apprehend the meaning differs in different stages of the mental development.

In making the transition to application it is important that the instruction begin with simple opportunities to apply reading. Later the application should become more and more complex and more and more intricate.

The school has in the past given too little attention to the special forms of mental activity which are involved in the application of reading. Pupils have been allowed to go out of the elementary schools with the ability to read, but they have never had their attention drawn to the fact that this ability would help them to acquire the information that they need to guide them in the mechanical arts which they take up as a means of livelihood. The fact is that pupils who leave the school at the end of the sixth grade very seldom help themselves in later life by using the power which they have. This is partly due to the fact that they do not know that there is a body of written and printed material which would be of value to them, and it is partly due to the fact that they have

never acquired the habit of carrying their reading process beyond the earliest formal stages. The school ought to show them that there is a body of material other than poetry and literary prose. The school ought also to indicate to the children that such reading as they do in poetry and literary prose is not intended to limit them to this type of material, but is intended rather to develop their powers so that in later life they may have independent use of the ability to read. There are certain definite suggestions which can be made along these lines. The writer knows of a case in which the teacher who found it difficult to interest boys in the middle of the elementary school in reading went to a neighboring manufacturing concern and secured copies of their trade catalogues. These catalogues were brought into the school and made the subject of reading. Instantly the boys recognized, as they never had recognized before, that the art of reading had direct relation to practical life. The advantage of such training consisted not merely in the information which they acquired about that particular industry, but also in the habit which they cultivated of using the power of reading to meet all of the practical emergencies of life.

In the same way girls may be introduced to books about kitchen implements and textiles. Either one of these subjects can be made of interest to the girls, and in addition they find in the perusal of this type of material an enlargement of the reading habit which will make them conscious of its value in a way which they are not likely to understand from the study of verse and literary prose alone.

In some cases perhaps the applications which will justify the formal work of the school can be made at the same time that the pupil is acquiring the power to read or use number. There is great danger, however, that we shall make an effort to accomplish something in the way of application before the power to read or the power to use number is sufficiently mature to justify the larger effort to carry it out into practical fields. Thus in an earlier paper, attention was drawn to the impossibility of correlating arithmetic and shopwork before there is any maturity of arithmetical interest. In the same way the pupil who is unable to read for meaning, because his whole attention is absorbed in looking

at the words and articulating them, never can acquire a piece of information which calls for attention to the meaning of these words. He must have a sufficiently mature power of reading and of using numbers so that he may have freedom of attention for the higher step of application. For this reason, it is not possible to introduce practical applications too early in the grades. Indeed, there is no necessity in the lowest grades of the elementary school of any large practical motives to encourage the children to acquire reading and writing and number ideas. Children in these lower grades are very docile and willing to take up any kind of material that society sees fit to furnish. During these earlier periods it is advantageous, therefore, that they should be taught to read and use numbers. They are very eager to be introduced to the printed page, and they are very willing to do a large amount of drudgery in the acquisition of number ideas. It is a mistake to surfeit them at this time with outside ideas, and with industrial projects which are too mature for them to comprehend. They should be kept in contact with the social arts which will later make possible some view of the practical world. The practical world will appeal to them very much more as they become mature. Children who have reached the fourth or fifth grade are very likely to leave school just because the practical world makes a strong appeal to them, and they do not see the utility at that time of further lessons in reading and number work. If the earlier grades of the school waste time and energy in the effort to bring to the attention of young children bodies of information for which they are not prepared, and if now in the fourth or fifth grade they are driven to learn something about reading and number in order that they may have a rudimentary possession of these arts, they are likely to become discouraged, and exhibit that discouragement by abandoning the school for practical experience.

The change which should be made in our elementary school in conformity to the principle of application should be made, therefore, in the fourth and fifth years, and from that point onward. The methods of teaching reading and number below this period are well organized and successful. The waste in elementary education appears from the fourth grade on. It is a waste of much of the time of the children who remain in school, and it is also a

waste of the community's efforts because the training of the upper grades does not reach as many children as it should.

In the foregoing discussion special emphasis has been laid upon reading. Arithmetic has been mentioned incidentally as a form of training which also should wait for its application. Writing, drawing, and also a direct acquaintance with space through some simple problems in constructive geometry, might properly be recommended under this principle as the best materials for the lower grades of the elementary school.

In an earlier paper the present writer suggested that there is too much haste in the introduction of concrete material into the school. The meaning of that statement in terms of this principle of application is that concrete opportunities to use one's knowledge should not be offered before the child has sufficient mastery of the arts of reading, writing, and number to justify the school in its efforts to deal with concrete material. Children have plenty of concrete ideas when they come to school. The difficulty is to show them how this concrete experience should be worked over and intellectualized. The school should supplement the child's ordinary experience by showing him new methods of dealing with these experiences. The school could never accomplish its purpose by devoting itself exclusively to shop training and handwork. These are essentially concrete forms of experience. Here again it is more important that the child should learn how to plan his work and how to record his plans than that he should be brought merely into contact with the materials of shopwork. The concrete in education has its proper place, but that proper place is at the point of application of powers which have been gained. These powers are essentially intellectual in character, and they need at first relatively very little concrete material on which to work.

The best types of concrete material to use in the early stages of any instruction are materials which are so simple that the attention of the pupil will not be distracted by the material itself. It must be admitted of course that it would be quite impossible to teach practical ideas without having some objects for the pupils to handle. These objects should, however, be very simple objects such as splints for arithmetic, or the immediate objects of the

environment for writing and reading. It is quite impossible to expect the pupils to employ number ideas which are altogether immature, and at the same time recall, through imagination, objects that are remote and relatively unfamiliar. There is nothing concrete about an example in interest and percentage to the child who does not understand numbers well enough to spend some mental energy thinking about interest and percentage. Indeed, it may be doubted whether most children in the elementary school have sufficient imagery to make it possible for them to use at any time intelligently such problems as those which are involved in bank transactions. Simple, concrete material as illustrating mental processes may therefore be advocated without leading to the demand that we use at all times in elementary instruction concrete material. Here again a distinction of importance can be drawn between material which illustrates and material which furnishes an opportunity for the application of mature forms of thought. The illustrative material is present for the purpose of cultivating a form of thought. The material to which one applies his powers is introduced for an entirely different purpose, and his mental attitude toward it is entirely different. In the one case the attention is upon the process, and not upon the concrete material, while in the other case, attention is chiefly upon the concrete material itself.

In conclusion, it may be said by way of summary that it has been the purpose of this article to point out the importance of doing more work in the elementary school in the direction of making school-work practical in character. The school must itself discover to the child the possibilities of using the training which he has received; that is, the school should make training in application a special problem to be worked out after the child has cultivated powers which he can apply.